UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,408	02/06/2004	Derek D. Kumar	6665.110A	2073

7590 04/28/2008

Joseph W. Berenato, III
Liniak, Berenato & White, LLC
Suite 240
6550 Rock Spring Drive
Bethesda, MD 20817

EXAMINER	
PUENTE, EVA YI ZHENG	
ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
04/28/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/772,408	KUMAR, DEREK D.	
	Examiner	**Art Unit**	
	EVA Y. PUENTE	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 27 December 2007.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-36 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-36 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 12/27/07 have been fully considered but they are not persuasive. Examiner has thoroughly reviewed Applicant’s arguments but firmly believes that the cited reference reasonably and properly meet the claimed limitation as rejected.

Applicant’s argument – (A) Prior art Muhammad does not teach or suggest a "transmitter...comprising..." as claimed. Muhammad’s sigma-delta ADC mixer is only used in a receiver, not a transmitter. (B) Prior art Shamlou et al teaches away from using sigma-delta modulation with a low bit weight word. (C) Prior art Hansen failed to teach or suggest features recited in the claim. (D) Shamlou, Muhammad, and Hansen with alone or in combination do not teach or suggest “generate a low bit weight digital signal by demodulating” as recited in claims 23, 24, and 27.

Examiner’s response – (A) Prior art Shamlou et al disclose a wireless audio signal transmitter (12 in Fig. 1) comprises a baseband processor (58), which includes a microphone to receive analog signal from a signal source and convert the analog signal to digital signal, etc (Col 4, L7-20). Shamlou et al did not specify the property of ADC or the specific kind of ADC used. Prior art Muhammad disclose a sigma-delta analog-to-digital (ADC) converter (Fig. 1). In the background teaching, Muhammad clearly stated that the sigma-delta ADC is commonly used in variety of applications. An advantage of sigma-delta ADC over PCM ADC is lower precision requirement and use single or low multi-bit quantizers ([0004]). Applicant points out that Muhammad's sigma-delta ADC is

used in receiver only. Such statement is unjustified. ADC is a well known communication device. While Muhammad's own invention is direct to the receiver, his background teaching provides sufficient reason and enough motivation to apply the sigma-delta ADC in Shamlou et al.'s transmitter. This way, provide noise shaping and high frequency operation in a radio communication system (Muhammad, abstract). Therefore, it is proper to combine the teaching of Shamlou et al and Muhammad. (B) As mentioned above, Muhammad clearly stated that the advantage of sigma-delta ADC over PCM ADC is lower precision requirement and use single or low multi-bit quantizers ([0004]). Even if applicant is correct about Shamlou use PCM, to apply the sigma-delta ADC of Muhammad would correct such deficiency and be advantageous. Therefore, Shamlou et al does not teach away from using sigma-delta modulation with a low bit weight word. (C) To provide noise shaping and high frequency operation in a radio communication system, it is obvious to one of ordinary skill in art to combine the teaching of sigma-delta ADC of Muhammad with the RF transmitter of Shamlou et al. In addition, Hansen disclose a transceiver that comprises a transmitter for transmitting voice signal through a source and provide data through a scrambler and a forward error correction (FEC) unit (18 and 28 in Fig. 1). In this way, specific bit loading can be performed (abstract). It is obvious to one of ordinary skill in art to combine the encoding teaching of Hansen with the RF transmitter of Shamlou et al. By doing so, optimize bit rates and error rates. Therefore, the combination of Shamlou et al, Muhammad et al, and Hansen meet the claimed limitation. (D) Shamlou depicts a transmitter (12) and a receiver (14 in Fig. 1) communicates via wireless antennas (22). The receiver receives

RF signal transmitted by the transmitter (24 in Fig.1). The receiver is coupled to a demodulator (28, shown in details in Fig. 3), wherein comprises an ADC (108 in Fig. 3). The output of the demodulator (46 in Fig.3) is couple to the baseband processor (58). Muhammad discloses that the sigma-delta ADC is commonly used in variety of applications. An advantage of sigma-delta ADC over PCM ADC is lower precision requirement and use single or low multi-bit quantizers ([0004]). It is obvious to one of ordinary skill in art to substitute the sigma-delta ADC of Muhammad with the conventional ADC of Shamlou et al. By doing so, provide noise shaping and high frequency operation in a radio receiver communication system. It is unclear the logic of applicant's assertion of Shamlou would generate low bit weight digital signal by sampling the already demodulated signal. As depict in Fig. 3, the output of the demodulator (46) would produce (by the demodulator 28) the low bit weight digital signal. Therefore, the combination of Shamlou et al, Muhammad et al, and Hansen meet the claimed limitation. All other claims are rejected based on the reasons provided above.

2. Objection to drawing and claims has been withdrawn.

3. Claim rejections under 35 U.S.C. 112, second paragraph have been withdrawn.

4. Objection to the specification is still maintained since there's lack of antecedent basis in view of claim 32.

Specification

5. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Regarding to claim 32, recitation "a second receiver" with "a second demodulator", there's a lack of antecedent basis in specification.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 2, 5, 7, 8, 10-22, 27 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shamlou et al (US 6,690,949) in view of Muhammad et al (US 2003/0080888), further in view of Hansen (US 2002/0097791).

a) Regarding to claims 1, 5, and 34, Shamlou et al disclose a wireless audio signal transmitter for transmitting an audio signal to a receiver, said transmitter comprising:

an analog signal source generating an analog audio signal of a desired audio bandwidth (58 in Fig. 1, wherein the baseband processor include a microphone, Col 4, L7-20);

an analog signal sampling circuit (the baseband processor include sampling and analog-to-digital converter, Col 4, L7-20); and

a digital modulator generates a representation of a desired RF signal for transmission to a receiver (38 in Fig. 2, wherein the shaping filter is a DQPSK modulator, Col 4, L56-67);

wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel (22 and 42).

Shamlou et al disclose all the subject matters above except for the specific teaching of (1) ADC is responsive to the analog audio signal and generating a sequence of low bit weight digital words, wherein said low bit weight words comprise binary words having four or fewer bits per word; and wherein the sampling circuit samples the audio signal at a sampling frequency substantially greater than twice the highest frequency for the desired bandwidth of the audio signal. (2) A data encoder that encodes the signal into an error control coded digital signal.

However, (1) Muhammad et al disclose a sigma-delta analog-to-digital converter that use low multi-bit (two, three, or four bit), and operate at much higher frequencies, which refers to as oversampling ([0004]; Fig. 1). It is well known in the art that oversampling is a signal sampled at a frequency higher than the Nyquist frequency so as to avoid aliasing. The sigma-delta ADC makes the precision requirements much

lower than the PCM ADC and operates at higher frequencies. Muhammad also stated that the sigma-delta ADC is commonly used in variety of applications. Therefore, it is obvious to one of ordinary skill in art to combine the teaching of sigma-delta ADC of Muhammad with the RF transmitter of Shamlou et al. By doing so, provide noise shaping and high frequency operation in a transmitter communication system.

(2) Hansen disclose a transceiver that comprises a transmitter for transmitting voice signal through a source and provide data through a scrambler and a forward error correction (FEC) unit (18 and 28 in Fig. 1). In this way, specific bit loading can be performed (abstract). Therefore, it is obvious to one of ordinary skill in art to implement the encoder of Hansen after sigma-delta ADC of Muhammad and before the modulator of Shamlou et al in the transmitter. By doing so, optimize bit rates and error rates.

b) Regarding to claims 2 and 19, Muhammad et al disclose wherein said analog signal sampling circuit generates a sequence of low bit weight digital words having one bit per word (ADC use single bit; [0004]).

c) Regarding to claim 7, Hansen disclose wherein said encoder comprises:

a scrambler responsive to said series of low bit weight words generating, through binary addition with a deterministic sequence of ones and zeros, a randomized sequence (28 in Fig. 1);

a forward error control encoder responsive to said randomized sequence to generate a plurality of coded output bits for each randomized sequence input bit (FEC 28 in Fig.1); and

an interleaver responsive to said plurality of coded output bits and generating a shuffled sequence comprising said error control coded digital signal (30 in Fig. 1).

d) Regarding to claim 8, Shamlou, Muhammad and Hansen are silent about the interleaver length. However, it would have been obvious to one of ordinary skill art to modify the RF system of Shamlou with less than one millisecond interleaver length when data is transmitted at one megabit per second, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, Eli f.2d 272, 205 USPQ 215

e) Regarding to claim 10, Shamlou et al disclose wherein said modulator generates an RF signal in an unlicensed frequency band (900MHz, Col 3, L39-45).

f) Regarding to claims 11-13, Shamlou et al teaches GSM communication system operate in 900MHz or 1900MHz, etc, but is silent about specific frequency range as claimed. However, it would have been obvious to one of ordinary skill in the art to operate Shamlou et al's system at higher frequencies such as claimed. Applicant has not discloses a reason or advantage to operate in such frequency ranges. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with Shamlou et al because they are both direct to wireless audio communication. Therefore, it would have been obvious to one of ordinary skill in art to modify Shamlou et al to obtain the invention as specified in claims.

g) Regarding to claim 14, Shamlou et al disclose wherein said analog signal source comprises a transducer (microphone, Col 4, L15-20).

h) Regarding to claim 15, Shamlou et al disclose wherein said transducer comprises a microphone (Col 4, L15-20).

i) Regarding to claim 16, Shamlou et al disclose

an antenna responsive to said desired RF signal (22 in Fig. 2); and

a housing adapted to support said microphone, said delta-sigma modulator, said data encoder, said digital modulator and said antenna (transmitter shown in Fig. 2).

i) Regarding to claims 17 and 18, Shamlou et al disclose a method for transmitting a Radio Frequency (RF) signal corresponding to an analog audio or acoustic signal, comprising the method steps of:

(a) converting an analog audio or acoustic signal (Fig. 1; the baseband processor include sampling and analog-to-digital converter, Col 4, L7-20);

(c) modulating an RF carrier signal to generate an digital transmission signal (38 in Fig. 2, wherein the shaping filter is a DQPSK modulator, Col 4, L56-67); and

(d) transmitting digital transmission signal to a receiver via a wireless channel (22 and 42 in Fig. 1).

Shamlou et al disclose all the subject matters above except for the specific teaching of (1) converting analog signal into a low bit weight digital words comprising four or fewer bits per word. (2) encoding to provide error correction code.

However, (1) Muhammad et al disclose a sigma-delta analog-to-digital converter that use low multi-bit (two, three, or four bit), and operate at much higher frequencies, which refers to as oversampling ([0004]; Fig. 1). The sigma-delta ADC makes the precision requirements much lower than the PCM ADC and operates at higher

frequencies. Muhammad also stated that the sigma-delta ADC is commonly used in variety of applications. Therefore, it is obvious to one of ordinary skill in art to combine the teaching of sigma-delta ADC of Muhammad with the RF transmitter of Shamlou et al. By doing so, provide noise shaping and high frequency operation in a radio communication system.

(2) Hansen disclose that a transceiver that comprises a transmitter for transmitting voice signal through a source and provide data through a scrambler and a forward error correction (FEC) unit (18 and 28 in Fig. 1). In this way, specific bit loading can be performed (abstract). Therefore, it is obvious to one of ordinary skill in art to implement the encoder of Hansen after sigma-delta ADC of Muhammad and before the modulator of Shamlou et al in the transmitter. By doing so, optimize bit rates and error rates.

k) Regarding to claim 20, Hansen discloses a FEC encoder (28 in Fig. 1). It is well known that convolutional error correction perform FEC.

l) Regarding to claim 21, Shamlou et al disclose wherein modulating step (c) comprises modulating an RF carrier signal with said encoded low bit weight digital signal using QAM quadrature amplitude digital modulation methods to generate an encoded low-bit weight digital transmission signal (Col 4, L56-67).

m) Regarding to claim 22, Shamlou et al disclose wherein modulating step (c) comprises modulating an RF carrier signal with said encoded low bit weight digital signal using QPSK quadrature phase shift keying digital modulation methods to generate an encoded low-bit weight digital transmission signal (Col 4, L56-67).

n) Regarding to claim 27, Shamlou et al disclose a wireless audio signal transmission system, comprising:

a transmitter, including:

an analog signal source generating an analog audio signal of a desired audio bandwidth (58 in Fig. 1, wherein the baseband processor include a microphone, Col 4, L7-20);

an analog signal sampling circuit (the baseband processor include sampling and analog-to-digital converter, Col 4, L7-20); and

a digital modulator generates a representation of a desired RF signal for transmission to a receiver (38 in Fig. 2, wherein the shaping filter is a DQPSK modulator, Col 4, L56-67);

wherein the desired RF signal is transmitter wirelessly (22 and 42 in Fig. 1); and

a receiver in communication with said transmitter via at least one wireless channel and receiving said desired RF signal (24 in Fig. 1); said receiver including

a demodulator responsive to said RF signal (28 in Fig. 1).

Shamlou et al disclose all the subject matters above except for the specific teaching of ADC is responsive to the analog audio signal and generating a sequence of low bit weight digital words, wherein said low bit weight words comprise binary words having four or fewer bits per word; and wherein the sampling circuit samples the audio signal at a sampling frequency substantially greater than twice the highest frequency for the desired bandwidth of the audio signal.

However, Muhammad et al disclose a sigma-delta analog-to-digital converter that use low multi-bit (two, three, or four bit), and operate at much higher frequencies, which refers to as oversampling ([0004]; Fig. 1). It is well known in the art that oversampling is a signal sampled at a frequency higher than the Nyquist frequency so as to avoid aliasing. The sigma-delta ADC makes the precision requirements much lower than the PCM ADC and operates at higher frequencies. Muhammad also stated that the sigma-delta ADC is commonly used in variety of applications. Therefore, it is obvious to one of ordinary skill in art to combine the teaching of sigma-delta ADC of Muhammad with the RF transmitter of Shamlou et al. By doing so, provide noise shaping and high frequency operation in a transmitter communication system. Moreover, Shamlou depicts the receiver receives RF signal transmitted by the transmitter (24 in Fig.1). The receiver is coupled to a demodulator (28, shown in details in Fig. 3), wherein comprises an ADC (108 in Fig. 3). The output of the demodulator (46 in Fig.3) is couple to the baseband processor (58). It is obvious to one of ordinary skill in art to substitute the sigma-delta ADC of Muhammad with the conventional ADC of Shamlou et al. The output of the demodulator (46, Shamlou et al) would produce (by the demodulator 28) the low bit weight digital signal. Therefore, provide noise shaping and high frequency operation in a radio receiver communication system.

o) Regarding to claim 32, Shamlou disclose that the RF communication system uses transmitters and receivers (Col 1, L1-14), wherein comprises a modulator and demodulator, respectively (16 and 28 in Fig. 1). Therefore, it is obvious to one of ordinary skill in art to provide a second receiver including a second demodulator by the

teaching of Shamlou in combination with the teaching of Muhammad so as to be configured to generate a second digital low bit weight digital signal. By doing so, provide receiver diversity and improve signals receiving quality.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shamlou et al (US 6,690,949) in view of Muhammad et al (US 2003/0080888), further in view of Hansen (US 2002/0097791), and further in view of Peters et al (US 6,876,697).

Regarding to claim 6, Shamlou, Muhammad and Hansen disclose all the subject matters above except for the specific teaching of analog I and Q signals and a I/Q modulator.

However, Peters disclose a transmitter in a wireless communication system comprises an in-phase analog signal (17 in Fig. 2) and a quadrature analog signal (15), and a I/Q modulator (20) having a first input responsive to the in-phase analog signal and having a second input responsive to the quadrature analog signal to generate an RF signal. This is sufficient to bias the I/Q modulator to maximum gain (Col 4, L13-22). Therefore, it is obvious to one of ordinary skill in art to combine teaching of in-phase, quadrature analog signal and analog I/Q modulator of Peters with the RF transmitter of Shamlou et al. By doing so, optimize signal gain at transmitter in a wireless communication system.

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shamlou et al (US 6,690,949) in view of Muhammad et al (US 2003/0080888), further in view of Hansen (US 2002/0097791), and further in view of A. Jacobsen (US 2003/0193889).

Regarding to claim 9, Shamlou, Muhammad and Hansen disclose all the subject matters above except for the specific teaching of forward error control input to a parallel to serial converter.

However, A. Jacobsen disclose a wireless communication device comprises a transmitter, wherein data to be transmitted is applied to FEC (312), and interleaver (314) and then to S/P converter (316 in Fig. 3). These are well know and common processors in a wireless communication system. Therefore, it is obvious to one of ordinary skill in art to implement to FEC, interleaving, and S/P teaching of A. Jacobsen in the RF communication system of Shamlou. By doing so, provide proper constellation point from modulation in a transmitter.

10. Claims 3, 4, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shamlou et al (US 6,690,949) in view of Muhammad et al (US 2003/0080888), further in view of Hansen (US 2002/0097791), and further in view of Watanabe (US 7,136,420).

a) Regarding to claims 3, 4 and 33, Shamlou et al disclose a wireless audio signal transmitter transmitting an audio signal to a receiver, said transmitter comprising:

an analog signal source generating an analog audio signal of a desired audio bandwidth (58 in Fig. 1, wherein the baseband processor include a microphone, Col 4,

L7-20);

an analog signal sampling circuit (the baseband processor include sampling and analog-to-digital converter, Col 4, L7-20); and

a digital modulator generates a representation of a desired RF signal for transmission to a receiver (38 in Fig. 2, wherein the shaping filter is a DQPSK modulator, Col 4, L56-67).

Shamlou et al disclose all the subject matters above except for the specific teaching of (1) ADC is responsive to the analog audio signal and generating a sequence of low bit weight digital words, wherein said low bit weight words comprise binary words having four or fewer bits per word; and wherein the sampling circuit samples the audio signal at a sampling frequency of substantially 2.8224 megahertz. (2) a data encoder to encode error control coded digital signal.

However, (1) Muhammad et al disclose a sigma-delta analog-to-digital converter that use low multi-bit (two, three, or four bit), and operate at much higher frequencies, which refers to as oversampling ([0004]; Fig. 1). The sigma-delta ADC makes the precision requirements much lower than the PCM ADC and operates at higher frequencies. Muhammad also stated that the sigma-delta ADC is commonly used in variety of applications. In addition, Watanabe disclose that delta sigma modulator operate at sampling frequency of 2.8224 megahertz, which is substantially greater than forty thousand times and eighty thousand times per second. Therefore, it is obvious to one of ordinary skill in art to combine the teaching of sigma-delta ADC of Muhammad and sampling frequency rate of Watanabe with the RF transmitter of Shamlou et al. By

doing so, provide noise shaping and high frequency operation in a transmitter communication system.

(2) Hansen disclose that a transceiver that comprises a transmitter for transmitting voice signal through a source and provide data through a scrambler and a forward error correction (FEC) unit (18 and 28 in Fig. 1). In this way, specific bit loading can be performed (abstract). Therefore, it is obvious to one of ordinary skill in art to implement the encoder of Hansen after sigma-delta ADC of Muhammad and before the modulator of Shamlou et al in the transmitter. By doing so, optimize bit rates and error rates.

11. Claims 23, 24, and 35, are rejected under 35 U.S.C. 103(a) as being unpatentable over Shamlou et al (US 6,690,949) in view of Muhammad et al (US 2003/0080888), further in view of Jackson et al (US 5,592,165).

a) Regarding to claims 23 and 35, Shamlou et al depicts the receiver receives RF signal transmitted by the transmitter (24 in Fig.1). The receiver is coupled to a demodulator (28, shown in details in Fig. 3), wherein comprises an ADC (108 in Fig. 3). The output of the demodulator (46 in Fig.3) is couple to the baseband processor (58). Muhammad et al disclose a sigma-delta analog-to-digital converter that use low multi-bit (two, three, or four bit), and operate at much higher frequencies, which refers to as oversampling ([0004]; Fig. 1). The sigma-delta ADC makes the precision requirements much lower than the PCM ADC and operates at higher frequencies. Therefore, it is obvious to one of ordinary skill in art to substitute the sigma-delta ADC of Muhammad

with the conventional ADC of Shamlou et al. The output of the demodulator (46, Shamlou et al) would produce (by the demodulator 28) the low bit weight digital signal. By doing so, provide noise shaping and high frequency operation in a radio receiver communication system.

Shamlou et al and Muhammad et al are silent about a digital decimating low pass filter. However, Jackson et al disclose a codec system comprises a sigma-delta ADC converter (18 in Fig. 1) coupled to a low pass decimation filter (20 in Fig. 1), and the output is coupled to a format converter (24) to generate a pulse code modulation digital audio signal (Col 3,L1-36). Therefore, it is obvious to one of ordinary skill in art to combine the teaching of low pass decimation filter and format converter of Jackson with the wireless communication system of Shamlou and Muhammad. By doing so, provide better filtering characteristics and accurate network communication.

b) Regarding to claim 24, Jackson et al disclose a digital to analog converter responsive to said pulse code modulation digital signal audio signal and configured to generate an analog audio signal (32 in Fig. 1).

12. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shamlou et al (US 6,690,949) in view of Muhammad et al (US 2003/0080888), further in view of Jackson et al (US 5,592,165), and in further view of Willenegger (US 6,996,069).

a) Regarding to claims 25 and 26, Shamlou et al, Muhammad et al and Jackson are silent about a power sensing circuit and a power level feedback signal.

However, Willenegger discloses a CDMA communication system comprises a transceiver (Fig. 8), wherein the receiver (822) receives RF signal and determines a received SNR by the quality measurement (828). The quality controller (830) sends a feedback power control signal (844) from the receiver to the transmitter (846; Col 16, L23-59). The power control mechanism achieves the desire level of performance and reduces power consumption while reducing interference (Col 1, L42-54; Col 2, L36-39). Therefore, it is obvious to one of ordinary skill in art to implement the power control and feedback teaching of Willenegger in the wireless communication of Shamlou et al. By doing so, provide better signal quality detection, reduce power consumption, and reduce interference in a wireless communication system.

13. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shamlou et al (US 6,690,949) in view of Muhammad et al (US 2003/0080888), in view of Hansen (US 2002/0097791), and further in view of Jackson et al (US 5,592,165).

a) Regarding to claim 28, Shamlou, Muhammad, and Hansen are silent about a digital decimating low pass filter. However, Jackson et al disclose a codec system comprises a sigma-delta ADC converter (18 in Fig. 1) coupled to a low pass decimation filter (20 in Fig. 1), and the output is coupled to a format converter (24) to generate a pulse code modulation digital audio signal (Col 3,L1-36). Therefore, it is obvious to one of ordinary skill in art to combine the teaching of low pass decimation filter and format converter of Jackson with the wireless communication system of Shamlou, Muhammad

and Hansen. By doing so, provide better filtering characteristics and accurate network communication.

b) Regarding to claim 29, Jackson et al disclose a digital to analog converter responsive to said digital filtered signal and configured to generate an analog audio signal (32 in Fig. 1).

14. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shamlou et al (US 6,690,949) in view of Muhammad et al (US 2003/0080888), further in view of Hansen (US 2002/0097791), and in further view of Willenegger (US 6,996,069).

a) Regarding to claims 30 and 31, Shamlou et al, Muhammad et al and Jackson are silent about a power sensing circuit and a power level feedback signal.

However, Willenegger discloses a CDMA communication system comprises a transceiver (Fig. 8), wherein the receiver (822) receives RF signal and determines a received SNR by the quality measurement (828). The quality controller (830) sends a feedback power control signal (844) from the receiver to the transmitter (846; Col 16, L23-59). The power control mechanism achieves the desire level of performance while reducing interference and maximizing system capacity (Col 1, L42-54; Col 2, L36-39). Therefore, it is obvious to one of ordinary skill in art to implement the power control and feedback teaching of Willenegger in the wireless communication of Shamlou et al. By doing so, provide better signal quality detection and reduce interference in a wireless communication system.

15. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shamlou et al (US 6,690,949) in view of Muhammad et al (US 2003/0080888), and further in view of Masenten et al (US 7,173,980).

a) Regarding to claim 36, Shamlou et al disclose a wireless audio signal receiver (14 in Fig. 1) receiving an audio signal from a transmitter (12 in Fig. 1), said receiver comprising:

a reception circuit receiving RF signal from a transmitter over a wireless channel (24 in Fig. 1).

Shamlou et al teach a wireless audio signal transmitter (12 in Fig. 1) comprises a baseband processor (58), which includes a microphone to receive analog signal from a signal source and convert the analog signal to digital signal, etc (Col 4, L7-20). Shamlou et al did not specify the property of ADC or the specific kind of ADC used. However, Muhammad discloses a sigma-delta analog-to-digital (ADC) converter (Fig. 1) that use low multi-bit (two, three, or four bit), and operate at much higher frequencies, which refers to as oversampling ([0004]; Fig. 1). It is well known in the art that oversampling is a signal sampled at a frequency higher than the Nyquist frequency so as to avoid aliasing. The sigma-delta ADC makes the precision requirements much lower than the PCM ADC and operates at higher frequencies. Muhammad also stated that the sigma-delta ADC is commonly used in variety of applications. Therefore, it is obvious to one of ordinary skill in art to combine the teaching of sigma-delta ADC of Muhammad with the RF transmitter of Shamlou et al. By doing so, provide noise shaping and high frequency operation in a transmitter communication system.

Moreover, Shamlou depicts the receiver receives RF signal transmitted by the transmitter (24 in Fig.1). The receiver is coupled to a demodulator (28, shown in details in Fig. 3), wherein comprises an ADC (108 in Fig. 3). The output of the demodulator (46 in Fig.3) is couple to the baseband processor (58). It is obvious to one of ordinary skill in art to substitute the sigma-delta ADC of Muhammad with the conventional ADC of Shamlou et al. The output of the demodulator (46, Shamlou et al) would produce (by the demodulator 28) the low bit weight digital signal. Therefore, provide noise shaping and high frequency operation in a radio receiver communication system.

Shamlou and Muhammad are silent about a decimating filter associated with the delta-sigma modulator.

However, Masenten et al. disclose an improved digital receiver (Fig. 3), wherein comprises decimation filter (150A and 150B) coupled to the output of sigma-delta modulator (140A and 140B). The decimation filter filters and decimates the output from the sigma-delta modulator to form a multi-bit digital signal at a predetermined sampling rate. The decimation filter has low pass frequency response to filter out noise (Col 6, L28-42). Therefore, it is obvious to one of ordinary skill in the art to combine the decimation filter teaching of Masenten et al. with the receiver system of Shamlou. This way, improve digital receiver system by eliminate unwanted noise and signal.

Conclusion

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eva Y Puente whose telephone number is 571-272-3049. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eva Yi Puente
/E. Y. P./
Examiner, Art Unit 2611

April 2, 2008

/Chieh M Fan/
Supervisory Patent Examiner, Art Unit 2611